

Applicant's Informal Comments on ISA Opinion

(1) Points of ISA opinion

5 The inventions defined by claims 1 to 12 do not have an inventive
step over the following documents 1 and 2.

Document 1: JP 2002-074675 A (paragraphs 0037 and 0038, Figure 1)

Document 2: JP 5(1993)-128564 A (paragraph 0019, Figure 3)

(2) Description of the present invention

10 In the present invention, in order to detect address information and
wobble information, initially, a differential signal in which an RF residual
component is allowed to remain so as to have a minimum effect on the
detection of the wobble is generated based on outputs from a tracking
detector. Further, based on the fact that in a recording timing, the
15 differential signal does not involve a detection signal corresponding to a land
pre-pit, the RF component that fatally hinders the detection of the land
pre-pit is removed by using a recording timing signal.

According to the present invention, a wobble balance detection circuit
and a wobble detection balance adjustment circuit that constitute an analog
20 circuitry can be integrated together, and an A/D converter to be included in a
digital circuitry is only for a difference signal. Therefore, the land pre-pit
can be detected with high accuracy by digital processing that causes no
variation of a circuit. Moreover, it is possible to reduce a circuit scale and
power consumption.

25 According to the invention defined by claim 1, a sum signal first is
converted into a binarized signal, i.e., a recording timing signal with no
amplitude information to be input to a digital signal processing portion via a
latch circuit, an unwanted component is removed from a difference signal
digitized by an A/D converter by using the recording timing signal, and a land

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pre-pit signal is detected. Consequently, the sum signal itself need not be subjected to A/D conversion, and it is possible to achieve a reduction in circuitry, such as an analog portion and an A/D converter, and in power consumption.

5 According to the invention defined by claim 2, although the basic configuration and operation are the same as those in the invention defined by claim 1, a timing signal obtained based on at least one of the output signals from a recording signal generation circuit and a reproduction signal generation circuit is used as a recording timing signal. Consequently, it is
10 not necessary to provide a circuit for generating a sum signal and a binarization circuit.

(3) Difference between the inventions described in the documents and the present invention

15 The document 1 describes that a land pre-pit signal is detected by subtracting a signal obtained by adjusting a gain and a phase of a sum signal from a difference signal between outputs from two detectors. This is practically the same as land pre-pit detection by changing a gain balance to adjust the same optimally for detecting a land pre-pit. That is, the invention
20 of the document 1 is practically the same as the invention described in JP 2002-216363 A cited as a conventional example, and is based on the principle described on page 22, line 16 to page 23, line 8 of the specification (page 23, line 26 to page 24, line 17 of the English specification).

 The document 2 describes that a gain balance between two detectors
25 is adjusted and an RF signal component in a difference signal is cancelled out completely for detecting a wobble. However, in the invention described in the document 2, only a specific portion of a wobble cycle is cancelled out in accordance with the gain balance in principle. Further, an optimum balance point for detecting a wobble is different from that for detecting a land pre-pit.
30 Therefore, it is impossible to perform optimum land pre-pit detection only by

combining the description in the document 1 with the description in the document 2.

For example, when an optical axis of a light beam is inclined, which is treated as a problem in the document 2, an optimum level of a sum signal for
5 detecting a land pre-pit is changed, which, however, cannot be adjusted automatically by a combination of the documents 1 and 2. More specifically, since the sum signal itself does not have balance information, it is impossible to detect an optimum level and make an adjustment by itself. Further, a wobble balance detection circuit cannot detect an optimum value for detecting
10 a land pre-pit and an optimum value for detecting a wobble at the same time.

After all, another balance detection circuit for a land pre-pit is required, which is treated as a problem in the present invention. Namely, the documents 1 and 2 merely describe the conventional example of the present invention and do not provide a solution to the problem.

15 As described above, even if it is obvious to remove noise by subtracting a noise component from a signal including the noise, the present invention provides a different method for extracting the noise component from that of the document 1. In the document 1, the sum signal whose gain and phase are merely adjusted is subtracted from the signal including the
20 noise. On the other hand, in the present invention, a recording timing signal is used in combination with a signal generated approximately by using a peak level of noise in a difference signal or a recording strategy, frequency characteristics of a reproduction system, or the like.